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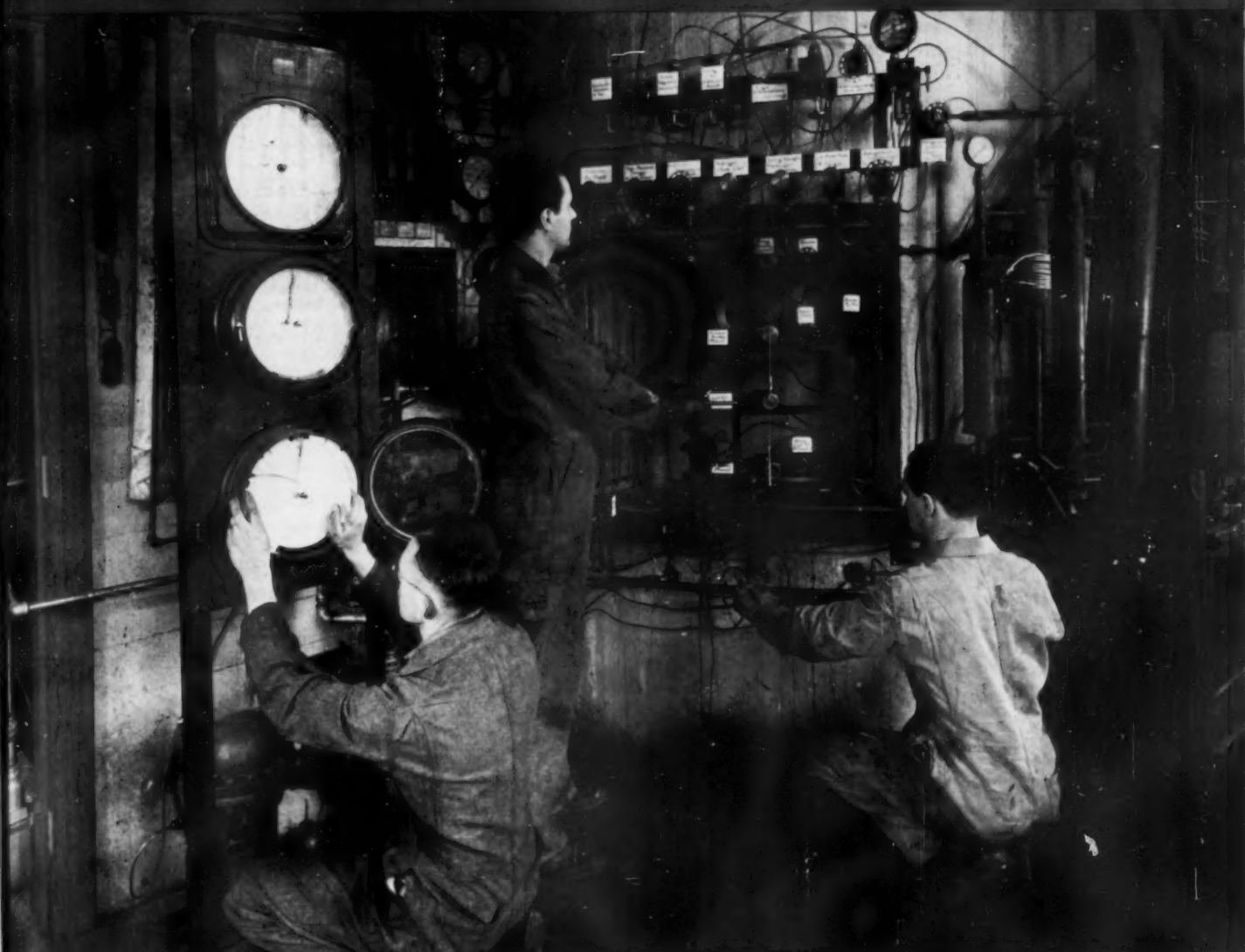
SCIENCE NEWS LETTER

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DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE • AUGUST 7, 1943



Gasoline from Coal

See Page B4

A SCIENCE SERVICE PUBLICATION

Do You Know?

Rock dust, used in coal mines to reduce explosion danger, also retards the decay of mine timbers.

Paraguay is a bilingual nation; Spanish is the official language but the language of the native Guarani Indians is widely used and is constantly heard in the national legislature.

The pleasant lemonlike *scent* in soaps and cosmetics frequently is from an extract from Cymbogon grass, a wild plant in the Far East; the grass is now being grown in Middle America.

War uses of *silver* include its use in airplane bearings, brazing alloys, electric contacts and photography, and as a substitute for copper in fine wires, and for copper and tin in plating processes.

Canada reports its experimental crops of *kok-saghyz*, the rubber-producing Russian dandelion, to be fairly successful; crops were tried at eight agricultural experiment stations across the Dominion.

Citronella oil, formerly obtained from Java and Ceylon, now produced in small quantities in Middle America, is the basis of many important aromatics used in soaps, cosmetics, perfumes, pharmaceuticals and flavors.

Radio *weather reports* were sent for nine months from an isolated Greenland ice cap outpost by seven Army men, now returned, who managed to keep alive through subzero weather, blinding blizzards and a 170 mile gale.

Question Box

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Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

Great Britain is receiving monthly from Belgian Congo about 1,000,000 carats of industrial diamonds.

Raspberry canes should be cut out immediately after fruiting to reduce pests and permit new canes to make better growth.

The bird collection in the Chicago Academy of Sciences now includes 10,000 specimens.

A 400,000 horsepower hydroelectric plant at the Des Joachims dam on the Ottawa River in Ontario is soon to be constructed.

SCIENCE NEWS LETTER

Vol. 44 AUGUST 7, 1943 No. 6

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. North 2255. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00; 15 cents a copy. Back numbers more than six months old, if still available 25 cents.

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Cable address: Scienservice, Washington.

New York office: 310 Fifth Avenue, CHickering 4-4565.

Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark.

mark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The Science Observer, established by the American Institute of the City of New York, is now included in the SCIENCE NEWS LETTER.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PENnsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STate 4439.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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NUTRITION

Diet Restores Disabled

Every one of 100 workers were restored to health and put back at work as result of specific dietary treatment, physician reports.

► THE POSSIBILITIES of increasing the nation's manpower by dietary means is illustrated in a report by Dr. Tom D. Spies, of Birmingham, Ala. (*Journal, American Medical Association*, July 31).

Every one of 100 disabled workers was restored to health and able to go back to work as a result of specific dietary treatment. They are not only working but able to earn enough to provide for themselves and families the kind of diet necessary to keep them well.

They have jobs in mines, steel mills, saw mills, cotton mills, department stores, airplane plants and various other industrial and commercial establishments. Not only they but their families are in better health as a result of their having learned what constitutes a good diet as well as being able to

provide such a diet through earnings.

These 100 rehabilitated workers are part of a larger group Dr. Spies has been studying since 1930 when he realized that persons with diseases due to faulty diet "were unbelievably weak and listless."

Diet treatment is not a panacea for every weak, listless but willing worker, he points out. Those who do not have nutritional deficiencies will not be benefited by it.

Included in the 100 rehabilitated workers is one young man, now about to enter the armed forces, who at the age of 15 was unable to walk or stand alone, to feed himself or even hold a glass, and who cried much of the time because of intense, persistent pain in his legs and arms. The boy's father worked in a steel mill, had a good income and

provided an adequate diet for the family even in the not too economically rosy 1930's. The boy got sick because "from the time he was old enough to eat solid foods he preferred bread, deserts and sweets to any other foods" and lived chiefly on these. Treatment with a diet that supplied the minerals, vitamins, and proteins his body had been starving for cured him.

No finicky appetite but a diet of only grits, corn bread and syrup eaten by a man who lost his job during the depression and wanted to make as little inroad as possible in the family's small food supply led to the nutritional breakdown of another of the patients. He got so weak he could not have worked if he had been able to get a job, and his mind became disordered. The mental symptoms grew so violent his wife was about to have him committed to an institution for treatment of mental diseases. The physician called recognized that his trouble was due to pellagra from poor diet and sent him to the Nutrition Clinic at Hillman Hospital where proper dietary treatment brought him back to health and working efficiency.

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PUBLIC HEALTH

Infantile Paralysis Cases Increase Again

► INFANTILE paralysis cases continued to increase, with the southwest still bearing the brunt of the incipient epidemic, latest figures reported to the U. S. Public Health Service show.

The total for the nation rose during the week ending July 24 to 324, as compared with 297 for the previous week. The July 24 total may be even higher when the report from Colorado comes in.

California reported the largest number of cases, 111, compared with the previous week's 90 in that state. The figures dropped a little in Texas, from 102 to 96, but rose in Oklahoma from 39 to 42. Perhaps signifying that the disease is spreading is the report of 10 cases in Louisiana, which reported none the previous week. Cases in Illinois increased from two to seven.

Kansas, with seven cases the week ending July 17, reported none for the week ending July 24. During the same period cases decreased from 11 to 10 in New York State and from seven to six in Arkansas. No other state reported more than five cases.

Science News Letter, August 7, 1943



NEW INSIGNIA—U. S. Army Air Forces personnel have no desire to have one of our own planes mistaken for those of the rising sun. So the old insignia, which was confusing at a distance, is replaced by this new one. The officers standing beside the plane are Col. Thomas W. Hastey, Commanding Officer of Bolling Field, D. C., and a member of his staff, Maj. Clark Coleman.

METALLURGY

Steel Tests Rushed

Pearl Harbor Navy Yard completes tests on samples at speed of one hundred a minute to fill immediate need for high-speed alloy from stock.

► **HOW STEEL SAMPLES** were tested as fast as one hundred per minute during work at the Pearl Harbor Navy Yard was reported to the Hawaiian Academy of Science meeting by W. Haskins Hammond, head of the Testing Laboratory at Pearl Harbor, and Lawrence Boggs, junior chemist.

Some months ago there was an immediate need at Pearl Harbor for some high-speed alloy steel. It was thought that this could be found among a large stock of rivet rods in a local storage yard. The Pearl Harbor Testing Laboratory was asked to make a rapid test of each piece of steel in the stock without disturbing its place in the pile. The time limit set for testing these thousands of pieces precluded use of ordinary chemical methods.

The speed with which the job was completed was attained by combining spark tests—sometimes used by mechanics and stockmen as a shop wrinkle—and a spot test for manganese adapted from a standard volumetric technique.

When steel is placed against a rapidly revolving grinding wheel a stream of sparks is given off whose form and color are dependent upon the type of steel.

Pure iron, or a steel with carbon below 0.2%, gives a spark picture of straight, unmodified carrier lines. At 0.2% carbon the lines begin to develop a few forks or primary bursts. With more carbon present, sufficient carbon dioxide is formed by oxidation of the incandescent particles to form increasingly brilliant bursts of typical forms.

Molybdenum in such a steel causes the formation of a detached orange-colored spear-point to the line. Nickel gives tiny blocks of brilliant white light; nickel and molybdenum together partly suppress the carbon bursts. Silicon, tungsten, and chromium give characteristic modifications. Plain low carbon steel gives a characterless stream with a minimum of bursts.

For the tests a field kit was made containing a portable grinder with an aluminum wheel, spot test equipment, and samples of Bureau of Standards analyzed alloy steels to use as test controls.

During the tests one or more laborers

moved ahead in order to shift the rods in the stock piles into a position so that the chemist could touch one end with his rapidly revolving grinding wheel.

When a spark stream was found that in any way looked unusual, the bar of steel was given a spot test. Drillings were taken from those bars which showed evidence of being high-speed steels, and full spectrographic analysis of these were made later in the laboratory.

"Success of these methods," Mr. Hammond stated, "is largely dependent on the judgment of the operator and his skill in matching the spark patterns of the unknown samples with those of the controls."

Science News Letter, August 7, 1943

PSYCHOLOGY-PHYSIOLOGY

Preventing Airsickness Problem in Air Transport

► **PREVENTING** airsickness is one of the problems of air transport of troops, it appears from a report by Comdr. Leon D. Carson, U. S. Navy, Dr. Walter R. Miles of Yale University School of Medicine and Dr. S. S. Stevens of Harvard to the Federation of American Societies for Experimental Biology.

"To arrive at the scene of battle with a load of thoroughly ill troops contributes nothing to fighting morale and effectiveness," they comment.

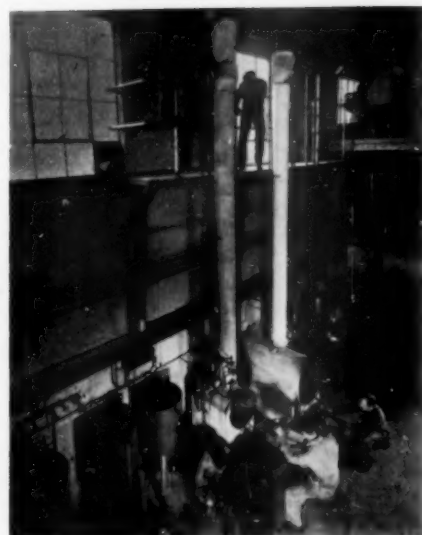
This unfortunate situation can to some extent be prevented, they believe, by giving the troops a chance to look out of the transport plane or glider.

Factors contributing to airsickness are the unavoidable motion stimulation of the vestibular mechanism of the ear, rapidly changing forces of gravity acting on internal organs, muscles and joints, and apprehension and past experience.

"All of these upsetting stimuli are as a rule less disturbing," the scientists declare, "if those affected can see out and establish visual contact with the horizon, with cloud formations and with the ground scene below."

Many troop-carrying glider crafts, the scientists state, give virtually no opportunity for this.

Science News Letter, August 7, 1943



"CRACKING" PLANT—Here the medium oil obtained in the first stage of coal liquefaction is "fractionated" or distilled to produce more gasoline, Diesel oil and other products. The photographs on this and the facing page and the front cover are of the U. S. Bureau of Mines coal hydrogenation plant at Pittsburgh.

CHEMISTRY

Gasoline Made From Coal In Bureau of Mines Plant

See Front Cover

► **CRACK APART** the molecules of ordinary coal, take out some of the atoms, add some hydrogen—and out comes gasoline and oil. It's not such an easy chemical job as it sounds but the Bureau of Mines has set up a small hydrogenation plant at Pittsburgh for the purpose and it is now in experimental operation as a pilot for future possible commercial use.

The control room of the plant is shown on the front cover of this week's *SCIENCE NEWS LETTER*. The valves and gauges control the process which takes place in a concrete chamber. In the first stage, coal yields about 20% gasoline and 80% medium oil. The oil can also be converted to gasoline by further treatment.

Experiments have indicated to the Bureau of Mines experts that the nation can develop enormous amounts of gasoline and oil from its coal reserves. If hydrogenation could be applied to our entire coal reserve, enough oil would be produced to supply the nation's needs for almost 3,000 years.

Germany and other European countries have been experimenting with the process for many years. It has been reported that Germany produces several

million tons of gasoline a year from coal. England is operating a similar plant.

Science News Letter, August 7, 1943

ENGINEERING

More Oil From Old Wells

After primary oil has been pumped out, electric pilot is used to locate areas likely to contain secondary deposits and then places chemicals in right spots.

➤ **MORE OIL** from the nation's oil fields by less labor are the twin benefits of the electric pilot described by Dana G. Hefley and P. E. Fitzgerald of Dowell Incorporated, Tulsa, Okla., in a report to the American Institute of Mining and Metallurgical Engineers (*Petroleum Technology*, July). After primary oil has been pumped from a well by ordinary methods, the instrument is used to locate areas that are likely to contain secondary oil deposits, then puts acidizing chemicals into the right place where they help to get out additional oil.

Using acid to increase production of an oil well and to shorten the time needed for recovering oil has often been successful. But most of the acidizing

methods used depend upon data about the well supplied by the geologist and engineer. In many cases, the zones specified were inaccurately located or the data were too meager for successful oil recovery.

The electric pilot, however, can quickly locate the areas containing oil, and then chemicals can be introduced through the device into the desired zones. Much time and quantities of acid are thereby saved in getting the secondary oil from the wells.

An electric circuit is completed and registers on an ammeter when contact of one or both electrodes of the electric pilot has been made with a conductor such as acid or salt water in the well; no current registers if the instrument

contacts a non-conductor such as oil.

Thus in actual well application, the amount of fluid injection can be controlled by maintaining the proper acid-oil level through reading the changing fluid-interfaces.

The use of the locator is valuable in acidizing many wells with high gas-oil ratios, high water-oil ratios, two or more 'pay' zones, sands exposed above or below limestone, leaky casings and deepened wells.

Better oil recovery and improved operating technique has resulted from use of the electric pilot, the scientists report.

Science News Letter, August 7, 1943

PUBLIC HEALTH

First Detailed Study Of Major Sicknesses

➤ **FACTS** which should prove useful to communities planning general health and medical care programs appear in a report, *Hospitalized Illness in New York City*, published by the city's Welfare Council.

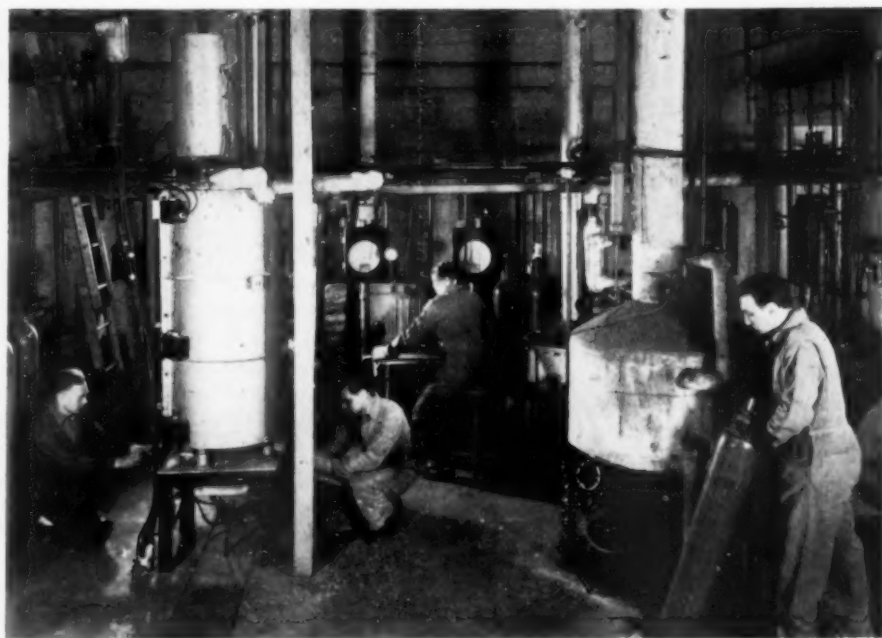
"Never before has so much detailed information regarding illness in a large city been made available," Dr. Charles F. Bolduan, former director of health education in the New York City Health Department, states.

The report, said to be the first detailed study ever undertaken in the United States or any other country to ascertain the occurrence of major diseases among the residents of a large city, was prepared by Dr. Neva R. Deardorff and Dr. Marta Fraenkel, of the Welfare Council's Research Bureau.

The most frequent operation in the year of the study was tonsil removal, performed on nearly 69,000 patients, mostly children. Accidental injuries, poisoning and broken bones made up the next group of conditions, other than obstetrical, for which hospital care was most frequently given. Obstetrical services accounted for almost one-fourth of the total number of hospital discharges.

The amount of specialized service given in general hospitals, and the reverse; the differences between the services given in municipal and voluntary hospitals; the number of times the same patient went to the hospital for the same condition in one year; and the length of each stay in a hospital are among the facts in the report which will provide practical suggestions for hospital and medical care planners.

Science News Letter, August 7, 1943



MAKING HYDROGEN—To make oil from coal in the Bureau of Mines Pittsburgh plant, hydrogen must first be made. This plant produces the necessary chemical element in gaseous form from fuel gas. The hydrogen is compressed and then fed under high pressure to a mixture of pulverized coal and oil which has been heated to a fairly high temperature.



THIN STEEL—Heart of an escort ship's electric drive is this rotor core for a motor under construction for the U. S. Navy at the Westinghouse East Pittsburgh Works. It is composed of hundreds of hoop-like sheets such as this, each about one-fourth as thick as this, each about one-fourth as thick as a dime. The "teeth" form slots into which copper coils are inserted.

GENERAL SCIENCE

Mexican Resort Adding Science to Attractions

► A FAVORITE Mexican resort city for American tourists is adding science and culture to its attractions.

Just a block north of Ambassador Morrow Street, named for the U. S. Ambassador who had a home in Cuernavaca, there is now a street that bears the name of the honorary president of the Mexican Academy of Sciences, Engineer Agustin Aragon y Leon.

This honor to one of Mexico's leading scientists, born 73 years ago in the state of Morelos of which Cuernavaca is the capital, is considered but part of a movement toward greater appreciation of science in this important region.

Governor Jesus Castillo Lopez has already announced his support of a Mexican Council of Learned Societies and he has invited the Mexican mathematicians to hold their second convention in Cuernavaca next May.

Engineer Aragon, for whom the street was named, was a member of the geodetic commission that set the border between the United States and Mexico. His career has been devoted to science, mathematics and philosophy as well as engineering.

Science News Letter, August 7, 1943

NUTRITION

Bread Prevents Disease

Two vitamin hunger diseases, beriberi and pellagra, have decreased "markedly and unmistakably" in New York as result of bread enrichment.

► BREAD is now preventing disease. Cases of two vitamin hunger diseases, beriberi and pellagra, have decreased "markedly and unmistakably" in the wards of Bellevue Hospital, New York, during 1942 and 1943, the period when enriched white bread and flour became universally available in that city, Dr. Norman Jolliffe, of New York University College of Medicine, declared at the meeting called by the Food Distribution Administrator to consider compulsory enrichment of all white flour as a war measure.

Only one-fourth as many patients with full-blown beriberi and only one-third as many pellagra patients are seen now in the wards of this hospital as were there in 1939, Dr. Jolliffe stated. He attributes this decrease to the bread enrichment program through which people are getting much more of the pellagra-preventing and beriberi-preventing vitamins, niacin and thiamin, than formerly.

Opposition, strongly vocal and somewhat unexpected, to the proposal for enriching all white flour developed from representatives of the baking industry, who urged enriching bread and other flour products at the bakery, rather than at the mill. Increased costs to bakers; loss of prestige and hurt pride because the bakers have heretofore played a big part in pushing the enrichment program; and fear of possible loss or waste of vitamins either in stored flour or in manufacture of certain bakery goods were the chief reasons given.

Evidence that destruction of vitamins in flour under storage would not be serious, nor the loss in baking crackers and such items very large, was presented by those favoring enrichment at the mill.

Government authorities lean to enrichment at the mill because of greater ease of enforcement of the order. The large number of bakeries, many of them small, would make supervision of enrichment of bread and bakery goods extremely difficult.

Millers seem willing to take on the entire enrichment job. They are already enriching a large proportion of all flour

and it is believed very few mills will need any extra equipment to enrich all white flour.

Flour should be enriched at the mill, Dr. Russell Wilder, chief of civilian food requirements branch of the Food Distribution Administration, declared, because the fault has been with the flour, not the bread. Finely milled white flour loses important vitamins and iron in the milling process. Enriching flour at the mill or source, he pointed out, follows the logic of purifying the water supply of an entire city rather than doing the job in each home and public building.

Whether all or only part of white flour is to be enriched, it may be possible to distinguish it after October 1 by a very faint creamy tinge due to the vitamin, riboflavin, which will be a must ingredient in all enriched flour and bread after that date. Riboflavin has a clear yellow color. In flour and bread, however, the color will be so diluted that most consumers probably will not notice it.

Science News Letter, August 7, 1943

PHYSICS

Metals Inspected by X-ray With Assembly-Line Speed

► ASSEMBLY LINE speed in X-ray inspection of metals has been achieved, making it possible to check airplane castings for defects at the unprecedented rate of 17,000 per 24-hour day. C. V. Aggers, manager of the X-ray Division of the Westinghouse Electric and Manufacturing Company, announced.

A moving conveyor is the key to the new unit's speed, providing the fastest method yet devised to spot flaws in large quantities of metal parts. Six castings up to five inches in thickness can be photographed every 30 seconds.

Now installed in a large war plant, the mechanism can be located anywhere in the factory since lead-lined hoods replace the lead-lined room formerly necessary.

Science News Letter, August 7, 1943

NUTRITION

More Enrichment

Sturdier staff of life as a support through possible scarcities, and pastries, cakes and crackers added to enriched list are possibilities for next winter.

By JANE STAFFORD

► BY THANKSGIVING, or soon after, Americans may be having a new cause for thanks in the food line in spite of rationing and war-caused food shortages, if the latest proposal of the War Food Administration goes into effect promptly.

This proposal is to require all white flour sold for human consumption to be enriched with certain B vitamins and iron according to the latest federal definition of enriched flour. The proposed order's 120-day allowance for millers and bakers to make the changeover would be just about up by Thanksgiving if the order were issued shortly after announcement of the proposal.

The stuffing of the Thanksgiving turkey or his substitute in that case may be more than just stuffing. The crust of the mince meat or pumpkin pie would be in the "good for you" class. And bread, traditionally the staff of life, would be a sturdier staff than it has been in a long time.

Equally important, everyone of us in the United States, if the order goes into effect, will be getting this mineral and vitamin enriched bread, whether we buy bread from the grocer or baker, eat it in restaurants, or bake it at home.

Rolls, pies and other pastries, cakes, biscuits and crackers will, if the proposed order goes through without change, be made from enriched flour, making them more nourishing than before. Up to the present, these foods, as well as home and restaurant baked bread and rolls, may or may not have been made of enriched flour. Food Distribution Order No. 1, issued last January, required all bakery white pan bread to be enriched, but other flour products, including home-baked, were not covered by the order.

Protection from Disease

The object of the proposed new order for enrichment of all white flour with certain B vitamins and iron is to protect civilians on wartime diets from vitamin lack diseases, such as pellagra and beri-

beri, and even from such mild states of undernourishment as make them feel tired and cranky and keep them from doing their best work. Our soldiers are already protected by an order under which the Army buys only enriched flour, although Army rations are planned to include plenty of other vitamin-rich foods. Civilian diet will depend much more on bread and flour as the war continues.

Our new enriched flour may be coming as a war measure but it will not be a dark flour, nor will bread made from it be a dark, wartime bread such as the English national loaf of 85% extraction wheat flour. It will make bread which will carry even more nourishment than the English national loaf, or than has been in the enriched flour sold in some communities during the past two years.

Announcement of the new enrichment proposal comes on the heels of two significant acts which probably few American bread eaters know about. One of these is a new Food, Drug and Cosmetic Administration order increasing the minimum amounts of certain vitamins and iron required in enriched flour. The other is a U. S. Supreme Court decision upholding the Food, Drug and Cosmetic Administration whose regulations on enriched flour and farina had been challenged.

Within Legal Rights

The Supreme Court found that this federal agency is quite within its legal rights in setting standards for the number, names and proportions of ingredients which may be added to food sold under a common or usual name, such as enriched flour. If there were no standards of identity for enriched flour, for example, the consumer would have to rely on the label on each package to learn which vitamins and minerals and how much of each had been added to a certain company's enriched flour, and how much nutritional benefit he might get from eating that flour in his bread.

That requires more technical knowledge, the decision points out, than the

average consumer is likely to have. As a result, he might be misled into thinking he would get more benefit from the product than would actually be the case. It was to avoid such a state of confusion that Congress empowered the Federal Security Administrator, under one of the provisions of the Food, Drug and Cosmetic Act, to set standards of identity for food when he considered this action necessary to promote honesty and fair dealing in the interest of consumers.

With this green light from the Supreme Court, the Food, Drug and Cosmetic Administration has issued the new standards for enriched flour which will go into effect about October 1. After that date, any flour sold as enriched will be richer by at least a third in the morale vitamin B₁, or thiamin, than enriched flour had to be in the past. It will contain more than two and one-half times as much of the pellagra-preventing vitamin, niacin, and more than twice as much iron as the previous minimum standards called for. In addition, it will contain another B vitamin, riboflavin.

Recently Made Available

Original plans for flour and bread enrichment called for this vitamin but only recently has enough of the synthetic riboflavin been available to make it possible to add it to flour or bread. Calcium, bone-building ingredient found abundantly in milk, remains an optional ingredient within certain new limits of some enriched flours but becomes a must ingredient in enriched self-rising flours.

The reason for increasing the amounts of vitamins and iron in enriched flour is that scientists have made further studies of the nourishing factors in the diets of various income groups and the population as a whole and of the daily allowances of various vitamins and minerals required for health. As a result, they found that the original standards for enriched flour would not give people eating it the degree of nutritional improvement expected on the basis of findings before the enrichment standards were set. Nor would it give the improvement consumers are entitled to expect from the publicity regarding enriched flour and bread made from it.

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OCEANOGRAPHY

Hydrolants Now Crackle From Radio Stations

► EVER HEAR of a hydrolant? Neither had Uncle Sam's sailors, but hydrolants are now crackling from radio stations along the East coast to warn of hazards at sea. The U. S. Navy's Hydrographic Office has coined the term from the phrase "hydrographic messages of the Atlantic."

These Morse code messages warn of sunken wrecks, drifting mines, unexploded depth charges, changes in position of lights or buoys, and other data that help protect our men from danger. This service is not a new one but has just been improved.

Each major broadcast will now carry the prefix, "Hydrolant Number." The hydrolants are numbered serially so that shipmasters can tell whether they have recorded all the important warnings. "Hydrolants Unnumbered" are not put in the series because of their local interest.

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PLANT PHYSIOLOGY

Vitamin B Found to Be Present in the Soil

► RIBOFLAVIN (vitamin B₂) is present in soils, tests conducted in the plant science laboratories of Syracuse University by Prof. C. C. Carpenter indicate; and further experiments apparently show that plants can absorb this vitamin through their roots.

Presence of riboflavin in soils was detected both by chemical analysis of soil extracts and by biological tests. In the latter, cultures of bacteria were fed on nutrient media containing the soil extracts; rates of bacterial growth furnished indices of the vitamin concentration.

Ability of higher plants to absorb riboflavin out of water solutions was next studied. Decapitated roots of tomato, tobacco, fuchsia and carrot were placed in the test solutions in the dark. This was done to minimize the plants' own manufacture of riboflavin. Similar roots were placed in distilled water only, as controls. Roots from the vitamin solutions were found to contain "several times the riboflavin found in the root sap where distilled water was used."

Riboflavin concentration in the soil was found to be greatest in soil types having a high organic content. Whether

the vitamin comes from the breakdown of plant tissues or whether it is synthesized by fungi, or both, Prof. Carpenter does not as yet undertake to say. Neither does he hold that it is necessary for the normal life of plants. However, in reporting his research (*Science*, July 30) he does add:

"If any of our crop plants supplement their synthesized vitamins with vitamins from the soil at different growth stages the presence or absence of vitamins in the soil immediately becomes a vital factor in crop production and soils management."

Science News Letter, August 7, 1943

MEDICINE

Saving Red Blood Cells Makes Banks Doubly Useful

► DURING the present conflict, when so much blood is being donated for the preparation of plasma, greater use should be made of the red cells that are now discarded, Dr. Howard L. Alt of the Northwestern University Medical School explained in *Science Service's* Adventures in Science program over the Columbia Broadcasting System.

"The patient with anemia really only needs the red cells, while the patient with shock needs plasma," Dr. Alt pointed out.

Whole blood consists of a straw-colored portion, the plasma, and blood cells. Red blood cells, Dr. Alt said, make up slightly less than half of the volume of the whole blood. In the preparation of plasma, which has proven so successful in the treatment of shock both on the battlefield and at home, red cells have been separated in a centrifuge and thrown away. Plasma can be kept for long periods, whereas the remaining cells, suspended in a small amount of residual plasma, must be used within three to five days after being drawn from the donor.

In the case of anemia, whole blood transfusions are usually given, but it is the red blood cells that are really needed, as the patient does not have enough of his own. In the past two years in England, and more recently in our own country, transfusion of concentrated red cell suspensions has been found as effective as whole blood in raising the red-cell level in patients with anemia. Reactions to the transfusions, such as fever and chills, are less common, Dr. Alt has found, than when the whole blood is used.

Science News Letter, August 7, 1943

IN SCIENCE

CHEMISTRY

Waterproof Coat Invented For Crystals Used in Radio

► QUARTZ CRYSTALS, among the bones of contention in the recent dispute between Henry Wallace and Jesse Jones, may be at least partly replaced in their war-essential radio control job by crystals of other materials, hitherto considered unsuitable because of their solubility in water. This is made possible through a system of waterproof coatings for piezo-electric crystals, the invention of John H. Ream, of Cleveland, covered by U. S. patent 2,324,024.

Piezo-electric crystals are slabs of certain crystalline materials that vibrate at remarkably constant rates under the impulse of high-frequency electric currents. They are used to keep radio apparatus of many kinds accurately tuned. Quartz has been the preferred material because other available substances, notably Rochelle salts, are water-soluble.

Mr. Ream's invention consists in coating the crystals with alternating layers of metal foil and moisture-proof plastic adhesive, with the necessary electrical leads securely sealed in. These waterproof capsules are good even for quartz crystals, he claims, because they prevent the precipitation of moisture that sometimes impairs their efficiency in present setups.

Rights in the patent are assigned to the Brush Development Company.

Science News Letter, August 7, 1943

METALLURGY

Hard Beryllium Face Put On Soft Copper Plates

► A NEW WAY to put a hard beryllium face on soft copper plates is covered by patent 2,325,041, assigned to Cooper-Wilford-Beryllium, Ltd., of Philadelphia, by its inventor, Hugh S. Cooper of Forest Hills, N. Y.

A very hard copper-beryllium alloy is reduced to a fine powder, which is spread on the face of the soft copper plate and the whole then subjected to heating at high temperature. Ordinarily, this would result in the oxidation of the beryllium and the defeat of the process; but in Mr. Cooper's method the heating is done in an atmosphere of hydrogen or other non-oxidizing gas.

Science News Letter, August 7, 1943

THE FIELDS

METALLURGY

Iron Salvaged from Slag As It Runs from Furnace

► SALVAGING IRON that is mixed in blast furnace slag in present-day production practice, and thereby lost, is the aim of a new device on which U. S. patent 2,324,938 has just been granted to Harry J. Love of Washington, D. C. In effect, the method is literally to shake the iron out of the slag.

As slag pours from the blast furnace, it normally carries with it a certain percentage of iron. The iron particles are heavier than the molten artificial lava, but due to its viscosity remain suspended in it. As the slag hardens they are imprisoned beyond any hope of practicable recovery.

Instead of draining off the slag through the conventional simple trough or runner now in use, Mr. Love uses a runner with a larger number of depressions or pockets in its floor, shaped more or less like cup-cake tins. The runner is built in linked sections, with mechanisms to give them a lively shaking as the slag runs through. This encourages the iron to settle out. Further encouragement is provided by another mechanism, which swings the whole runner sharply to and fro in a cradle movement, thereby bringing centrifugal force into play.

After the slag has been run off and the iron in the cups has solidified, the whole thing is turned upside down, and the miniature iron pigs drop out.

Science News Letter, August 7, 1943

ENGINEERING

Coal Dust Controlled By Chemical Wetting Agents

► WETTING coal dust with chemicals to prevent explosions is more effective than the older methods of water sprinkling or the use of rock dust, Rodney H. Honaker, Safety Director of the Guyan Eagle Coal Company, Amherstdale, W. Va., reported to the American Mining Congress. Although Mr. Honaker did not specify the wetting agents, some of those in use are compounds of sulphonated alcohol or by-products of organic manufacture which can be obtained cheaply from the large chemical companies.

Coal dust is thickest where cutting, drilling, blasting and loading of the coal is done. The removal of the dust at this point is beneficial to the health of the miner and reduces the chance of explosion to a minimum. The Bureau of Mines recommends that less than 20 million particles per cubic foot of air be maintained. This concentration will not explode and will not cause any harmful effects on breathing.

Spraying of the wetting agent should be done during the operation, before loading and during loading of the coal. The wetting agent's usefulness is in its ability to cause a clumping together of the particles of coal dust, by wetting them and trapping them in solution where they drop to the floor before they have a chance to disperse in the air.

Comparative tests have shown that these wetting agents have reduced the dust count by more than 60%.

Science News Letter, August 7, 1943

ENGINEERING

Light in Future May Cost Tenth of What It Does

► ELECTRIC LIGHT costing only a tenth of what it does today and used lavishly in our homes is foreseen as a practical possibility for 30 years hence by Ward Harrison of the General Electric Company, in a report to the Illuminating Engineering Society. (July)

Our lighting of tomorrow may be as different from present day lighting as Edison's first incandescent lamp differs from present lamps. A 100-watt lamp of today gives us five times the light of a lamp of the same wattage in 1913 and at one-half the cost of the current.

The best artificial light source of today, the fluorescent lamp, is less than one-quarter efficient. Improvement in its efficiency will mean more and better light. Maintenance of candlepower and eliminating the starters now used on fluorescent lamps are only two of the refinements which the future may bring.

Greatest advantage of the fluorescent lamp, according to Mr. Harrison, is its superior quality of high-level local lighting, but future lighting promises to be many times brighter. Conquering glare and heat, still largely untouched by illuminating engineers, will be another step forward.

Since light is expected to be cheaper, future building designs will include light as part of the whole construction plan.

Science News Letter, August 7, 1943

GENERAL SCIENCE

Thousands of Scientific Books Sent to Prisoners

► THOUSANDS of scientific books are being sent to prisoners of war at their own request by the War Prisoners' Aid of the Young Men's Christian Association.

A total of 3,179 volumes were mailed during the five months from last December to May, officials report, and expansion of the service is foreseen since shipping space is now provided more regularly.

Each book is sent free of charge through the "Men of Science-Prisoners of War" Service, as the YMCA has termed it, to fill the needs of the individual. Due to the great number of prisoners desiring serious literature and the growing shortage of books in Europe, requests are continually received from the international YMCA organization in Geneva, Switzerland, and from the British Red Cross.

Shipments have run the gamut of sciences from astronomy to zoology, plus the classics, philosophical and legal tomes, and the other humanities as well. Agriculture topped the list with 422 requests; the social sciences were a close runner up with a total of 413.

Language problems of men interned in a nation of foreign tongue may be reflected in the 385 volumes on languages mailed during the months just reported. Medicine and biology were also high on the list with 372 requests.

Science News Letter, August 7, 1943

BOTANY-PUBLIC HEALTH

Stop Weeds After Harvest Or Hay Fever Will Follow

► KEEP DOWN the weeds in your Victory Garden after you have harvested your main crop of vegetables, warns Oren C. Durham, chief botanist of the Abbott Laboratories at North Chicago, Ill. Ragweeds and other bearers of sneeze-provoking pollens thrive on gardens in a state of late-summer neglect.

The Victory Garden movement, Mr. Durham has found, resulted in the breaking of a really considerable acreage of vacant land this year, and it is in such newly disturbed soil that weeds take readiest hold. While the Victory Garden acreage is not great as compared with the total in ragweed, it puts numerous new pollen sources within city limits.

Science News Letter, August 7, 1943

METALLURGY

Progress Reported

Government announces new developments in production of war metals and quartz crystals and in the speeding of mapping from aerial photographs.

► **PRODUCTION** of high-purity metallic manganese from low-grade ores, production of quartz crystals in Arkansas for use in military radio, new tests for boiler-damaging water, advanced apparatus for aerial mapping, and investigation of hundreds of suggested processes for aluminum and magnesium production are new war developments on the scientific front.

Manganese, strategic war metal, used to give steel greater strength and workability, can now be obtained in nearly pure form from the vast low-grade deposits in the United States. The process, developed by Stephen M. Shelton of the U. S. Bureau of Mines, and covered by government patents is now putting high-purity manganese into special alloys for war weapons.

Two other scientists in the U. S. Bureau of Mines, William C. Schroeder and Abraham A. Berk, have developed a device that should minimize boiler failures in war plants and railway engines. Testing of embrittlement cracking characteristics of water is improved by the instrument.

The "photoalidade" is helping to speed the mapping of many war fronts, thanks to the ingenuity of Ronald M. Wilson of the U. S. Geological Survey. Cameras used in aerial photography are set on a slant and Mr. Wilson's de-

vice measures the vertical and horizontal angles.

Following discovery of quartz crystal deposits of electronic grade existing in Arkansas, engineers are now blowing the tops off two mountains to uncover new sources. Hundreds of pounds of top-notch crystals have already gone into the production of war equipment, WPB's Office of Production Research and Development reported. A steady but small supply of crystals is expected to flow from the Arkansas beds as development proceeds.

The U. S. Bureau of Mines and the U. S. Geological Survey are exploring in a dozen more states. OPRD has seen to it that other experts and millions of dollars in equipment were sent to expand production in Brazil, source of most of our quartz crystals.

Even more important is the discovery of an improved method of cutting the crystals. Other studies have found uses for some of the less perfect crystals which were formerly discarded.

Sixty different processes for stepping up aluminum production have been studied; a half dozen have been approved by the OPRD for further development. They use high-silica bauxite of which the nation has heavy deposits and also make use of clays with heavy alumina content.

Science News Letter, August 7, 1943

RESOURCES

Bottleneck Broken

Quartz crystals for radar and other military radios are now more plentiful as result of discovery of new sources and other research results.

► **QUARTZ CRYSTALS**, essential for military radio and radar apparatus, have finally been pushed off the "desperately needed" list by discovery of quartz deposits, by salvage of crystals formerly discarded, and by research successes that have just upped production of crystal oscillator plates more than a third.

Supplies are still barely adequate,

WPB reports, but only a few months ago it looked like there would be only half enough.

Prospectors tracked down every clue that might lead to the hiding place of one of the nation's most badly needed natural resources. Recently they have discovered deposits in North Carolina, Virginia and California. Experts from

the U. S. Geological Survey are now pushing exploration in these and a dozen more western states.

During the past year deposits of electronic-grade crystals also have been unearthed in Arkansas and hundreds of pounds of top-notch crystals have already been produced, put into war equipment, and sent on their way to fighting fronts.

Thousands of pounds of crystals—good and bad—have been brought to light. Although quartz had been known to exist there for decades—the beautiful, transparent, six-sided crystals being sold to tourists as souvenirs—industrial production was not considered until urgent war needs developed.

Further search revealed favorable territory just northwest of Hot Springs, 30 miles wide and 100 miles long, stretching in a westerly direction almost to the Oklahoma border. Further prospecting is expected to reveal hundreds of small workable deposits throughout this region for years to come.

Much More Needed

Government mineral experts consider the Arkansas find as a reserve, however, and warn that our entire domestic production probably will be only a small part of the quartz crystals needed. Experts and equipment have recently been sent to Brazil to expand production there. Deposits deep in the Amazon jungle remain our chief source of supply.

Meanwhile, research workers have made three quartz crystals do the work of four. They have developed new methods that add to the supply as effectively as the discovery of new deposits. Thinner saws for cutting the crystals into the wafer-thin plates were developed, saving much of the crystal that was formerly sawed away into useless dust. Then the scientists found that they could cut the crystals into still thinner slices, thus doing away with much wasteful grinding in the finishing operation.

In use for only the past few weeks, the new cutting methods are producing at least a third more usable material.

Next the scientists took a look at the thousands of pounds of low-quality crystals that have been piling up in warehouses, discarded as unfit for electronic use. Experiments revealed special uses for some of these crystals and the huge amount of waste material on hand was converted into a usable stockpile.

More quartz crystals are needed. Quartz is among the world's commonest minerals. But the large, clear crystals



What goes on under a Nazi pilot's cap?

PUT YOURSELF IN HIS PLACE . . . in his cockpit climbing swiftly away from an Axis airfield into a pitch-black night . . . bomb racks loaded . . . heading for Yank-held territory.

How would your mind work (under a Nazi bonnet), if you knew Radar's sleepless, X-ray "eyes" were waiting up to greet you . . . on warships, airfields, and lookout posts of the United Nations' forces?

What would you be thinking . . . knowing that Radar was robbing you of "surprise", the attacker's one tactical advantage . . . detecting you as much as 130 miles from your target? *Always* watching you . . . in storm, clouds, and fog . . . five miles up or skimming the waves! . . . *marking you for ambush and destruction!*

Westinghouse was making Radar 18 months before Pearl Harbor. Since then, Westinghouse production of radio communications equipment, including Radar, has increased 41 times!

When the flak whams accurately through the clouds to rip jagged wing holes; when you meet night fighters who need no flame from your exhausts for true aiming, wouldn't you momentarily doubt the infallibility of the "master race"?

Wouldn't you nurse a scowling respect for American ingenuity? For Radar was developed in the United States . . . pretty much the product of Navy and Army research laboratories who weren't as unprepared as you thought.

And shouldn't it occur to you that a fellow can't win when he's fighting against a nation with the inventiveness and resources to produce weapons like this?

Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.

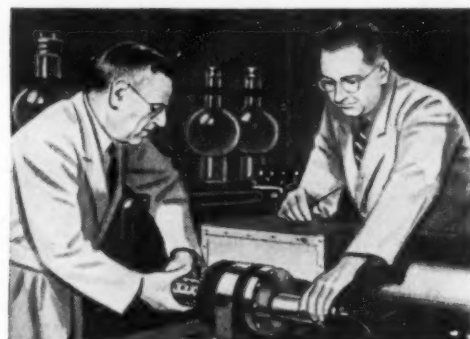
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Famous dates in the history of Radar



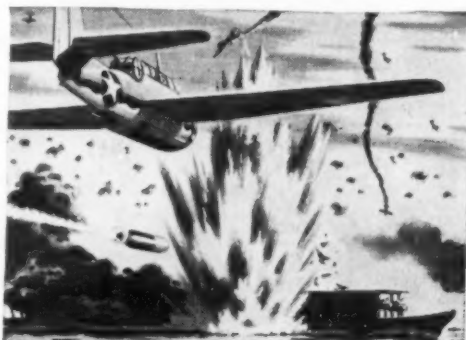
1922. Naval Laboratory, Anacostia, D.C. Dr. A. Hoyt Taylor and Leo C. Young, observing that radio signals were reflected by passing ships, saw in it a means of detecting enemy vessels in darkness and fog. This was the birth of Radar!



1937. Bloomfield, N.J. Westinghouse developed the key electronic tube for the U. S. Army's first Radar equipment used to detect aircraft. Radar focuses invisible, ultra-high-frequency waves traveling at 186,000 miles per second.



1941. Pearl Harbor, T. H. Approaching Jap bombers were detected by a Westinghouse-made Radar when 132 miles distant. Because a flight of American planes was expected, no warning was sounded.



1943. On every front Radar has revolutionized naval and air battle tactics . . . and multiplied a hundredfold the range of human vision. In days to come, Radar will guide air transports and ocean liners safely through fog and darkness.

required for radio purposes are rare. Amateur prospectors who want to help the war effort may send sample crystals, which they may discover lining cavities in rock or in the dirt and gravel nearby, to the Miscellaneous Minerals Division, War Production Board, Temporary R Building, Washington, D. C.

Only separate crystals as clear as glass are wanted, not clusters or grainy masses. Colored quartz, such as amethyst and onyx, cannot be used. Each crystal must

weigh at least a half pound; measured in inches such a crystal will be about an inch in diameter and three inches long. The whole crystal need not be perfect but large portions must be entirely free from specks, bubbles, lines, clouds, or flaws of any kind. Good parts must be at least two cubic inches in size and at least half as large as the imperfect section, otherwise it is not practicable to saw out the good portions.

Science News Letter, August 7, 1943

PUBLIC HEALTH

Major Epidemic Feared

National Foundation for Infantile Paralysis sees signs in cases already reported that 1943 may be one for the records. Peak will come later.

► "1943 MAY go down on the records as one of the major epidemic years for infantile paralysis," the National Foundation for Infantile Paralysis warns on the basis of the number of cases reported so far (See page 83 for new figures.)

The warning, carried to local chapters of the Foundation in its publication, *National Foundation News* (July), points out that "accurate predictions are impossible.

"Analysis of the situation at the end of the first 26 weeks of the year," the statement continues, "shows the total number of cases to be higher than for any of the past 12 years, excepting 1934. During the first six months, 1,084 cases were reported from 42 states. The six-

month average for the past ten years is 841.

"We know from records for the past 25 years that the peak of each year's outbreak, when figured for the country as a whole, is not reached until sometime between mid-August and mid-September. These records further reveal that the sharp increase in incidence occurs between July 1 and September 1 with a corresponding sharp decline during the ensuing two months.

"Even if 1943 has only an average number of cases there will be difficult problems for those areas that experience epidemics. With so many doctors, public health workers, nurses and physical therapy technicians serving in the Armed Forces, most communities won't be as well prepared as in former years to cope with an outbreak. Many will find a real challenge in the problem of providing ordinary and adequate care for their population without the added burden of an epidemic of infantile paralysis."

The National Foundation is doing all it can to supply epidemic areas with workers trained in the Kenny treatment. Local chapters are urged to work and plan with local and state medical and health authorities as well as with the National Foundation in order to be able to meet the needs that will arise when and if the epidemic strikes them.

Science News Letter, August 7, 1943

Bulgaria, it is reported, gathered and exported in 1942 nearly 7,000 tons of medicinal herbs from wild and cultivated plants.

● RADIO

Saturday, Aug. 14, 1:30 p.m., EFT

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. E. D. Merrill, of Arnold Arboretum, Harvard University, will tell about his *South Seas Manual of Emergency Foods and Poisonous Plants*.

PHOTOGRAPHY

Washing and Fixing Films With Sea Water Speeds Job

► SEA WATER with a final wash of fresh water will reduce the time of removing hypo and permit a fairly better non-fading image on films and prints than that of washing in fresh water alone. Mr. G. T. Eaton and J. I. Crabtree of Kodak Research Laboratories offer this time-saving possibility. (*American Photography*, June).

They have found that salts in seawater dehydrate the gelatin in the film, making it possible for the hypo to be washed from the film rapidly. When the film is washed in fresh water the retained hypo diffuses from the gelatin only slowly.

The one fault found in this washing in sea water was in the fact that the image was prone to fade more rapidly than when it was washed in fresh water, due to the presence of the sea salts. They found that this could be eliminated by removing the sea salts with a final fresh-water wash. Despite the necessity of this additional fresh-water wash, the time of removing the hypo and fixation of the image was still reduced by five to 25 minutes or better.

The procedure they suggest would be to wash in sea water for one-half the prescribed washing time for the material and then wash in fresh water for about five minutes, either in running water or two changes of water.

Science News Letter, August 7, 1943

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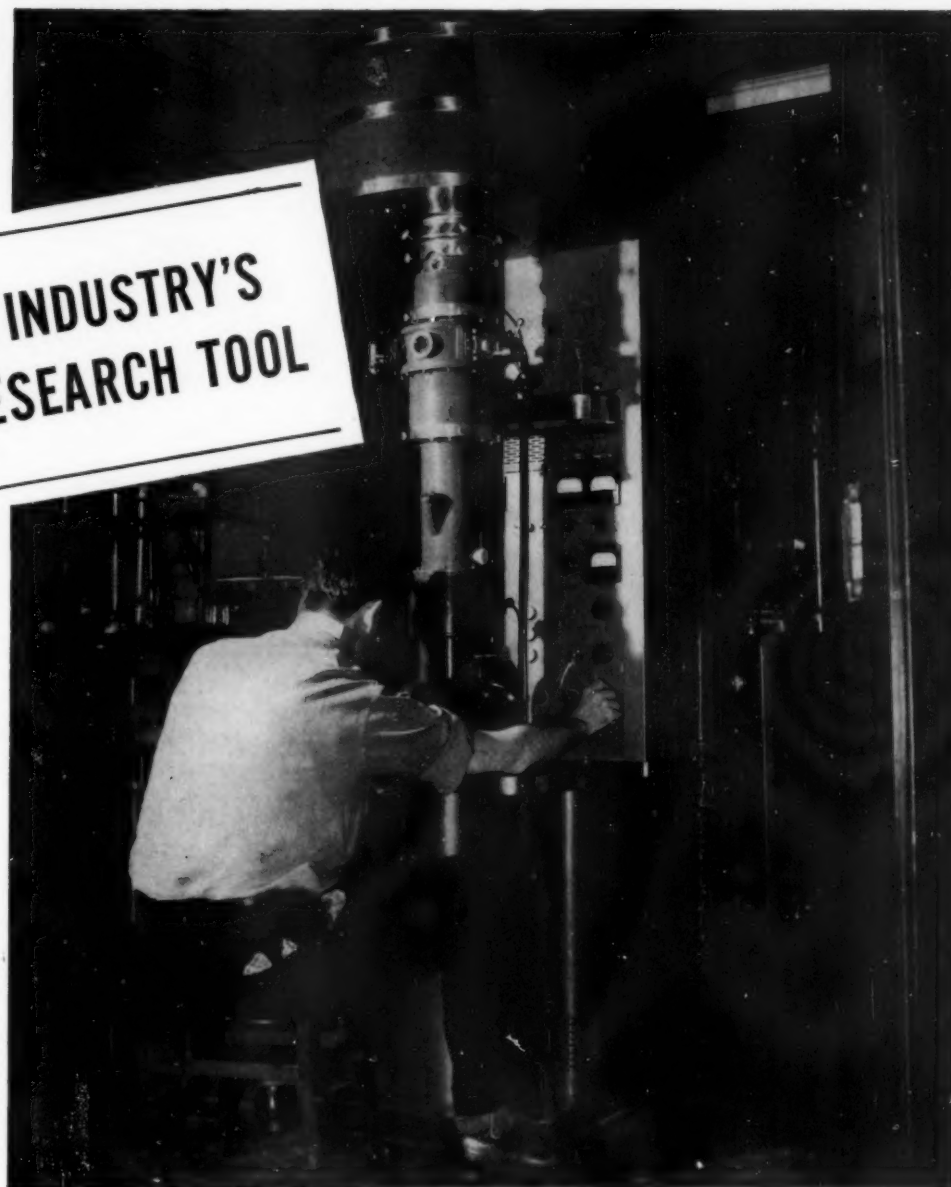
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SCIENCE AND INDUSTRY'S GREAT NEW RESEARCH TOOL



Dr. D. H. Reynolds at the RCA Electron Microscope installed in the Central Research laboratories of Monsanto Chemical Company.

Keen interest in the RCA Electron Microscope grows more and more general as new information is released about results obtained with this great research tool. Installed in nearly 50 of the most progressive industrial and institutional laboratories, many important discoveries have already been made with its aid.

In bacteriology, biology, metallurgy, chemistry, physics, and many other fields of research, the RCA Electron Microscope has abundantly proved its worth. Viruses, bacteria, fibers, catalysts, pigments, films, coatings, detergents, crystalline structures, plastics, particles, glazed and polished surfaces, are now being studied with such profound minuteness of detail as has never before been approached.



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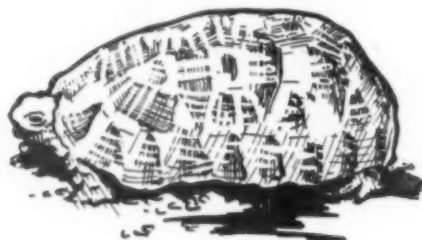
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RCA ELECTRON MICROSCOPE



Turtles Are Fun

► **TORTOISES** are good for something besides beating over-confident hares in footraces. They can teach many things to human beings, provided the latter bring to the lessons an open mind and a patience to match the deliberate methods of these crusty instructors.

A Washington woman, Mrs. Josephine Gibson Knowlton, one day years ago casually picked up a common box turtle (the kind with a hinge in the under-shell) and brought it home for a pet. That was the start of a fascinating hobby which she has followed for more than half a generation, and from which she has picked up so much interesting information not found in the books that she has finally wound up by writing a book herself. *My Turtles* has become one of the widely talked-about products of the present publishing season. (See SNL, July 3, p. 16.)

Once started on her career as a chelonologist (or is the right word chelonophile?) Mrs. Knowlton acquired turtles by dozens and scores. There were many species, a few from as far away as Australia and Africa; but for the most part she concentrated on two com-

mon kinds, box turtles and wood turtles. (Meticulous zoology would insist that these are tortoises, not turtles, since they are terrestrial, not aquatic; but why be fussy?) She has kept them in the pleasant garden behind her house in northwest Washington, which is arranged with special care for the comfort of its hard-shelled guests. Just now there are about 45 of them.

Her turtles know her voice, and come when she calls them. Some of them even recognize the approach of her husband, and meet him at the gate. One of them, a female named Virginia, casually gets up on her hind legs when she wants to increase her reach—a really astonishing feat, considering a turtle's build.

This Virginia, though one of the veterans of the flock, has not let the years detract from her charm. Two portraits of her by Charles Dana Gibson (who is Mrs. Knowlton's brother) adorn the book's jacket. They are probably the only pictures of a wide-waisted female that Mr. Gibson ever drew. But he does do justice to her dark and expressive eye.

Turtle society, as lived in Mrs. Knowlton's garden, is normally placid and amiable, unmarked by the bickerings that frequently arise among livelier animals. The economics of Turtledom seems to be non-competitive; at any rate, turtles do not fight over food, or nesting sites, or a place to dig in for the winter. They accept the companionship of strangers with equanimity; one made friends with a squirrel, another with a duck.

There seems to be just one dependable way to start a turtle fight: two males and one female. Which goes to show, perhaps, that turtles aren't as cold-blooded as formal zoological classification would make out.

Science News Letter, August 7, 1943

MYCOLOGY

Machine for Large-Scale Mold Cultivation Patented

► **GROWING MOLD** by the ton is the purpose of a mechanized setup on which U. S. patent 2,325,368 has been issued to Dr. Leo M. Christensen of the University of Nebraska. This does not mean that another good agricultural chemist has been driven daffy by the heat, nor yet that the Patent Office has followed him in his madness. On the contrary, this particular mold species has high value in our war industry, for it produces an enzyme that converts starch into fermentable sugar, which in turn is the source of alcohol for smokeless powder, synthetic rubber and a thousand other purposes. Incidentally, we got this mold from the Japs; it's the same one they use on rice in starting the making of saké.

The process starts with the flowing of bran from a big bin into a mingler that operates somewhat on the principle of a concrete mixer. Water containing necessary mineral salts is added, and the resulting mash is slowly carried on a conveyor belt through a steam sterilizer, then through a cooling chamber. After this, it falls into a second mingler, where billions of the mold spores are blown into it, then out again into pans on a second belt. This moves very slowly through a closed tunnel, kept well warmed, where the spores germinate and the mold grows into a practically solid white mat.

At the end of this line the mass is broken up into small fragments, and may also be dried. Then it is ready to be packed and shipped to the distilleries and industrial alcohol plants.

It is understood that Dr. Christensen's apparatus is not yet in commercial production, but is in the final stages of development at Lincoln.

Science News Letter, August 7, 1943

MATHEMATICS DICTIONARY

Invaluable in reading any book that uses mathematics.

THE JAMES MATHEMATICS DICTIONARY, the only such book now published, provides standard definitions of the terms and phrases from arithmetic through elementary differential equations, the technical terms ordinarily used in the applications of these subjects, and more advanced basic terms. Easy examples, many illustrations and all sorts of formulas are included. The appendix contains tables of weights and measures, a list of mathematical symbols and the tables ordinarily used in handbooks.

This dictionary is a great deal more than a collection of definitions. It explains, illustrates and correlates, stressing especially those operations that are hardest to understand. One reader has called it "Ten texts in one."

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New Machines And Gadgets

☼ **HOLLOW GLASS** building blocks have been patented that contain a louver-like metal screen to cut down light glare inside the building and to reduce heat radiation during hot days.

Science News Letter, August 7, 1943

☼ **PLANES** can take-off automatically, fly a predetermined course without a pilot, then safely land through an improved radio-control apparatus recently patented.

Science News Letter, August 7, 1943

☼ **A NEW HYPODERMIC** injector has no needle. Instead the liquid is expelled in a fine stream under sufficient pressure to puncture the skin and inject itself into the tissues, according to the inventor. Only a microscopic hole results. Depth of penetration is controlled by varying the pressure and the quantity of liquid injected. The patient has the sensation of a slight breeze blowing against the skin, it is reported, rather than a sensation of pain.

Science News Letter, August 7, 1943

☼ **BOTTLE OPENERS**, constructed of an inexpensive metal strip that fits neatly over the cap and down the side of the bottle, are designed to be sold with each bottle and used only once. Some day commercial use of the invention may eliminate the recurrent hunt for a bottle opener.

Science News Letter, August 7, 1943

☼ **STRAINS** that occur when a bullet smacks into armor plate are revealed by firing at steel and plastic targets



coated with lacquer. The circular pattern of tiny cracks which results is dyed to make the pattern more prominent, as shown in the picture. These tell-tale "footprints" are studied by engineers to aid development of better armor plate and better armor-piercing shells. The method is expected to have peacetime use for locating strains in machinery.

Science News Letter, August 7, 1943

☼ **NEARLY** three-fourths the time needed to machine 36% nickel alloy is being saved by adding a lustrous gray chemical element to the mixture. The alloy can be machined much more easily and retains its valuable property of expanding very little when heated.

Science News Letter, August 7, 1943

☼ **LOW-COST** sound recordings can now be made on film and played back immediately without processing. The method has proven especially useful in the business office for dictation and executives are able to send recorded messages to branch offices. Physicians can record the heart beat of a patient and file the strip of film for future comparison. The sound can be held to a whisper or amplified to fill an auditorium.

Science News Letter, August 7, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 168.

ENGINEERING

Telescoping Igloo Designed For Troops in Far North

➤ **AMERICAN TROOPS** in Alaska, Iceland and other high-latitude lands are often housed in semi-cylindrical "tin igloos." A structure of this type, that collapses into minimum bulk for shipping, is the subject of patent 2,323,106, granted to R. D. Whiteman of Piedmont, Kansas. The down-arching sides are so pivoted that they can be swung back into the central space of the hut. After that has been done, the roof is lowered by means of wound-up cables to little more than half its height when in use. The whole makes a conveniently box-like "package" for loading on truck, flatcar or boat.

Science News Letter, August 7, 1943

Germany is reported to be using 42% of its potato crop to make motor fuel.

NEW SCIENCE and WAR BOOKS

Dictionary of Science and Technology

In English, French, German and Spanish by Maxim Newmark. Separate indexes permitting two way reference of any of these languages. Conversion tables and technical abbreviations. Including the very latest war terms. Intended for engineering, scientific and technical libraries, for English-speaking industrial and technical personnel in South America and Europe, for radio monitors and short-wave broadcasters to foreign countries, for modern language teachers, professional translators, importers, exporters, and others. \$6.00

Encyclopedia of Substitutes and Synthetics

edited by Morris D. Schoengold with the collaboration of America's foremost chemical and industrial laboratories. Just out. Covers thousands of raw materials, chemicals, processes, substitutes, synthetics. Planned and laid out for war time needs. Not a mere listing of materials, but the whole story: Properties, Solubility, Substitutes, Uses, Processes. \$10.00

Rehabilitation of the War Injured

Written by over 50 outstanding specialists. Edited by William Brown Doherty. Dealing not only with Neurological and Psychiatric aspects of rehabilitation of the war injured, but also with Orthopedics, Occupational Therapy, Vocational Guidance, Physiotherapy, Reconstructive Surgery and Legal and Social aspects of rehabilitation. A most important volume for all those interested in social work, public health, occupational therapy and vocational guidance. \$10.00

Dictionary of Biochemistry

Edited by William Marias Malisoff. \$7.50

From Copernicus to Einstein

by Hans Reichenbach. The story of the theories that led to the development of Einstein's Theory of Relativity. Told simply, still on a high scientific plane. \$2.00

Conquest of Bacteria

By Frank Sherwood Taylor. The story of chemotherapy from salvarsan to sulfa. \$2.00

Petroleum Encyclopedia

by D. D. Leven. Revised by S. J. Pirson. The most comprehensive book on the subject. \$10.00

Twentieth Century Philosophy

Edited by Dagobert D. Runes. Including discussion of subjects as Philosophy of Science, Soviet Thought, Philosophies of China, etc., by such contributors as Roscoe Pound, John E. Boodin, Bertrand Russell, Alfred N. Whitehead, Jacques Maritain, George Santayana, John Dewey, Wing-tsit Chan. \$5.00

Dictionary of Sociology

Edited by Henry Pratt Fairchild. \$6.00

IN PREPARATION:

Twentieth Century Engineering by C. H. S. Tupholme. \$3.00
Twentieth Century Physics by Pascual Jordan. \$4.00
Virus Diseases in Man, Animal and Plant by Gustav Seiffert. \$4.00
The Chemistry of Synthetic Substances by Emil Dreher. \$3.00

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First Glances at New Books

► **AS THRILLING** as any saga of the sea is **DOCTORS AWEIGH** in which Rear Admiral Charles M. Oman, M.C., U.S.N., tells the story of the U. S. Navy Medical Corps in action (*Double-day Doran*, \$2.50). The book provides more than first-rate entertainment, however. It tells clearly and in full detail exactly how the Medical Department of the Navy protects the health and lives of our sailors and marines and, when occasion requires, members of our other fighting forces.

Science News Letter, August 7, 1943

► **A SHIP** in distress or an airplane downed at sea make immediate rescue possible by broadcasting distress signals giving their location. Those of us who have wondered how the exact location can be given so accurately miles from any landmark will enjoy John Favill's readable **PRIMER OF CELESTIAL NAVIGATION** (*Cornell Maritime Press*, \$2). Celestial navigation is the author's hobby, and he conveys his enthusiasm for the subject to the reader.

Science News Letter, August 7, 1943

► **CAN OPENERS** to range finders; machines are based on the same rudimentary principles described by Will M. Clark in **A MANUAL FOR MECHANICAL MOVEMENTS** (*Garden City Pub. Co.*, \$1.98). Leaning heavily on illustration rather than explanation, the book contains more than 400 drawings and 160 photographs. Mr. Clark's compilation should be of interest to those who work with machines.

Science News Letter, August 7, 1943

► **PETROLEUM** and the petroleum industry is covered in an exhaustive study by 126 geologists in **GEOLOGIC FORMATIONS AND ECONOMIC DEVELOPMENT OF THE OIL AND GAS FIELDS OF CALIFORNIA** (*California State Division of Mines*, \$4, paper; \$6, cloth). Prepared under the direction of Olaf P. Jenkins, this is an authentic up-to-date source book (in four parts) for those interested in this subject.

Science News Letter, August 7, 1943

► **ALASKA'S GEOGRAPHY**, people, natural resources and administration are discussed in **ALASKA: AMERICA'S CONTINENTAL FRONTIER OUTPOST**, another excellent addition to the War

Background Studies (*Smithsonian Institution*, Washington, D. C.). It was prepared by E. P. Walker of the Institution staff. It is beautifully illustrated with 40 insets of photographic reproductions and maps. (Free upon request to the Smithsonian)

Science News Letter, August 7, 1943

► **AERIAL PHOTOGRAPHY** students will be interested in a **MANUAL FOR INSTRUCTION IN MILITARY MAPS AND AERIAL PHOTOGRAPHS**, by N. F. Maclean and E. C. Olson (*Harper*, \$1.75). It is an addition to Harper's geoscience series.

Science News Letter, August 7, 1943

Just Off the Press

ADDENDUM TO THE CHEMISTRY OF THE AMINO ACIDS AND PROTEINS INCLUSIVE OF SOME OF THE ADVANCES SINCE 1937—Carl L. A. Schmidt, ed.—*Thomas*, 255 p., illus., \$5.

ANGEL OF THE NAVY: The Story of a Wave—Joan Angel—*Hastings House*, 200 p., illus., \$2.

EDUCATION IN WARTIME AND AFTER—Stanford Univ. School of Education Faculty—*Appleton-Century*, 465 p., \$3. Nowhere has the impact of war had a greater effect than in the schoolroom—also converted to war production. The last chapter takes a forward look to "tomorrow when peace will reign again."

EXPERIMENTS IN ELECTRONICS AND COMMUNICATION ENGINEERING: Covering Basic Circuit Theory, Electronics, Communication Networks, Radio and Ultra-High-Frequency Techniques—E. H. Schulz and L. T. Anderson—*Harper*, 381 p., illus., \$3. A guide for laboratory work in signal training schools and useful for other institutions with similar programs.

THE EXPRESSION OF PERSONALITY: Experimental Depth Psychology—Werner Wolff—*Harper*, 334 p., illus., \$3. An experimental approach to a study of unconscious forces.

FUNDAMENTAL PHYSICS—Lloyd William Taylor—*Houghton Mifflin Co.*, 662 p., plus XI p., illus., \$4. A textbook replacing the earlier work, *Physics: The Pioneer Science*. Designed to fit the needs of teachers who must train physicists for war but also for a more exacting time to follow.

HANDBOOK OF PLASTICS—Herbert R. Simonds and Carlton Ellis—*Van Nostrand*, 1082 p., illus., \$10.

A HANDBOOK OF PSYCHIATRY—P. M. Lichtenstein and S. M. Small—*Norton*, 330 p., \$3. Intended not only for students of psychiatry but also for others, such as social workers and nurses, who must care for the mentally ill.

HOSPITAL DISCHARGE STUDY: An Analysis of 576,623 Patients Discharged from Hospitals in New York City in 1933—Neva R. Deardorff and Marta Fraenkel—*Welfare Council of N. Y. City*, 349 p., illus., Vol. 2, \$2. Title of Vol. 2: *Hospitalized Illness in New York City*.

HOW THE ARMY FIGHTS: A Clear Expression of Modern High-Power Warfare—Lowell M. Limpus—*Appleton-Century*, 388 p., illus., \$3.

HOW TO RAISE RABBITS FOR FOOD AND FUR—Frank G. Ashbrook—*Orange Judd Pub. Co.*, 256 p., illus., \$2.

MAN AND HIS PHYSICAL UNIVERSE—Frank C. Jean, Ezra C. Harrah, Fred L. Herman and Samuel R. Powers—*Ginn and Co.*, 608 p., illus., \$3.25.

THE NEW WORLD GUIDES TO THE LATIN AMERICAN REPUBLICS—Earl Parker Hanson, ed.—*Duell, Sloan and Pearce*, 860 p., illus., \$2.50, Vol. 2.

SO YOU WANT TO BE A CHEMIST?—Herbert Coith—*McGraw Hill*, 128 p., \$1.50. An elementary, simply written book on how a chemist works and what he does. Information for the aspiring student.

A SURVEY OF ALCOHOL EDUCATION IN ELEMENTARY AND HIGH SCHOOLS IN THE UNITED STATES—Anne Roe—*Quarterly Journal of Studies on Alcohol*, 132 p., tables, \$1. Teaching practices and materials recommended by the Director of the Education Survey, Research Studies on Problems of Alcohol.

THE WAR IN MAPS: An Atlas of The New York Times Maps—Francis Brown—*Oxford*, 167 p., illus., \$2. 2d ed., rev. Maps by Emil Herlin and Vaughn Gray.

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